CHAPTER 2

DESCRIPTION OF THE CORDELL HULL LAKE WATERSHED

2.1. BACKGROUND. The Cordell Hull Lake Watershed is named in honor of Cordell Hull, a Tennessee Congressman and Secretary of State under President Woodrow Wilson. The Lake was created when the construction of the dam was completed and closed in 1973. Cordell Hull Lake is maintained by the U.S. Army Corps of Engineers.

This Chapter describes the location and characteristics of the Cordell Hull Lake Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Cordell Hull Lake Watershed is located in Middle Tennessee and includes parts of Clay, Jackson, Macon, Overton, Putnam, and Smith Counties.

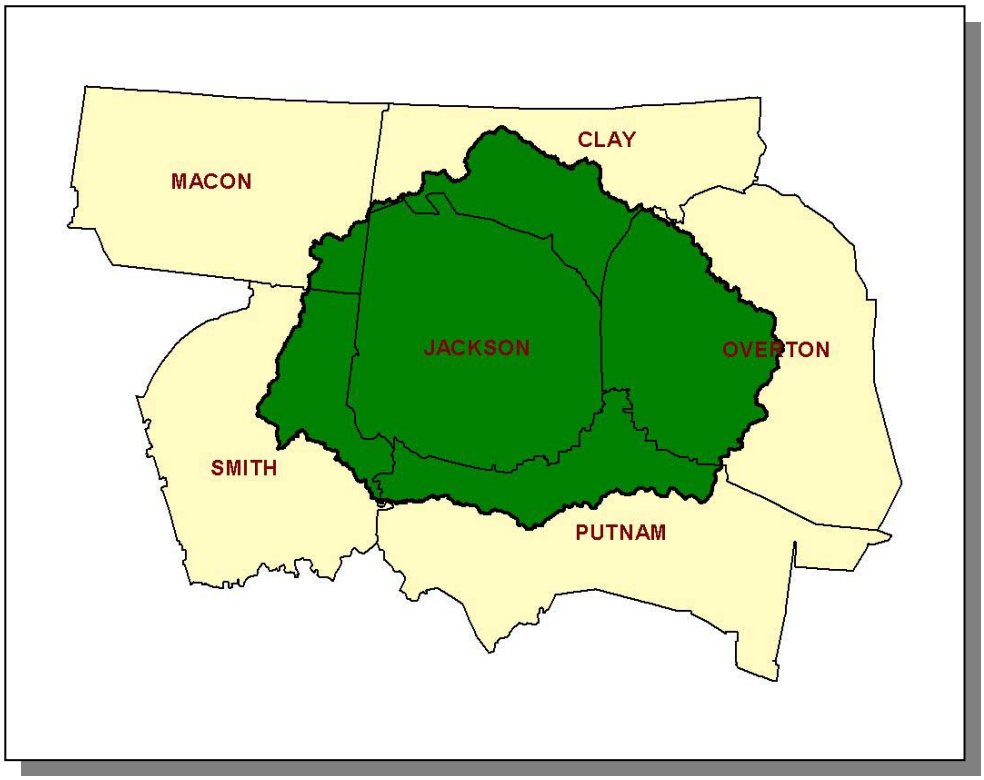

Figure 2-1. General Location of the Cordell Hull Lake Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
Jackson	41.2
Overton	23.0
Putnam	13.0
Clay	11.7
Smith	9.3
Macon	1.8

Table 2-1. The Cordell Hull Lake Watershed Includes Parts of Six Middle and East Tennessee Counties.

2.2.B. Population Density Centers. Twenty highways serve the major communities in the Cordell Hull Lake Watershed.

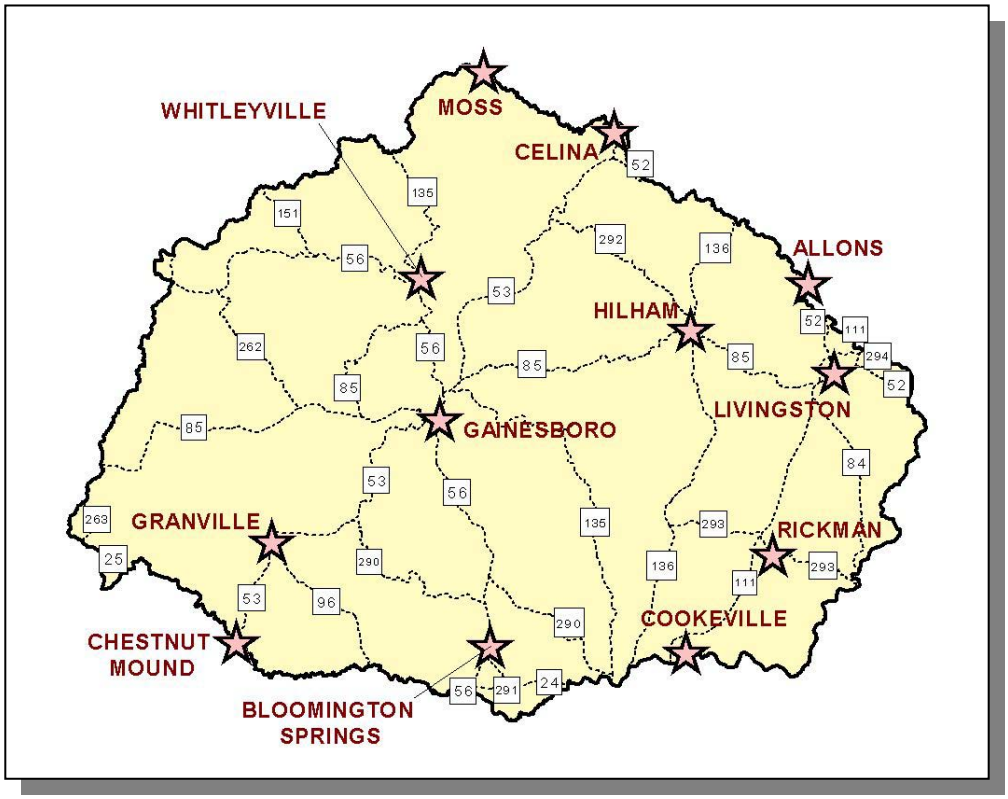

Figure 2-2. Municipalities and Roads in the Cordell Hull Lake Watershed.

MUNICIPALITY	POPULATION	COUNTY
Cookeville*	25,065	Putnam
Livingston*	3,498	Overton
Celina*	1,379	Clay
Gainesboro*	879	Jackson

Table 2-2. Municipalities in the Cordell Hull Lake Watershed. *Population based on 2000 census (Tennessee Blue Book) or http://www.hometownlocator.com. Asterisk (*) indicates county seat.*

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Cordell Hull Lake Watershed, designated 05130106 by the USGS, is approximately 790 square miles and drains to the Cumberland River.

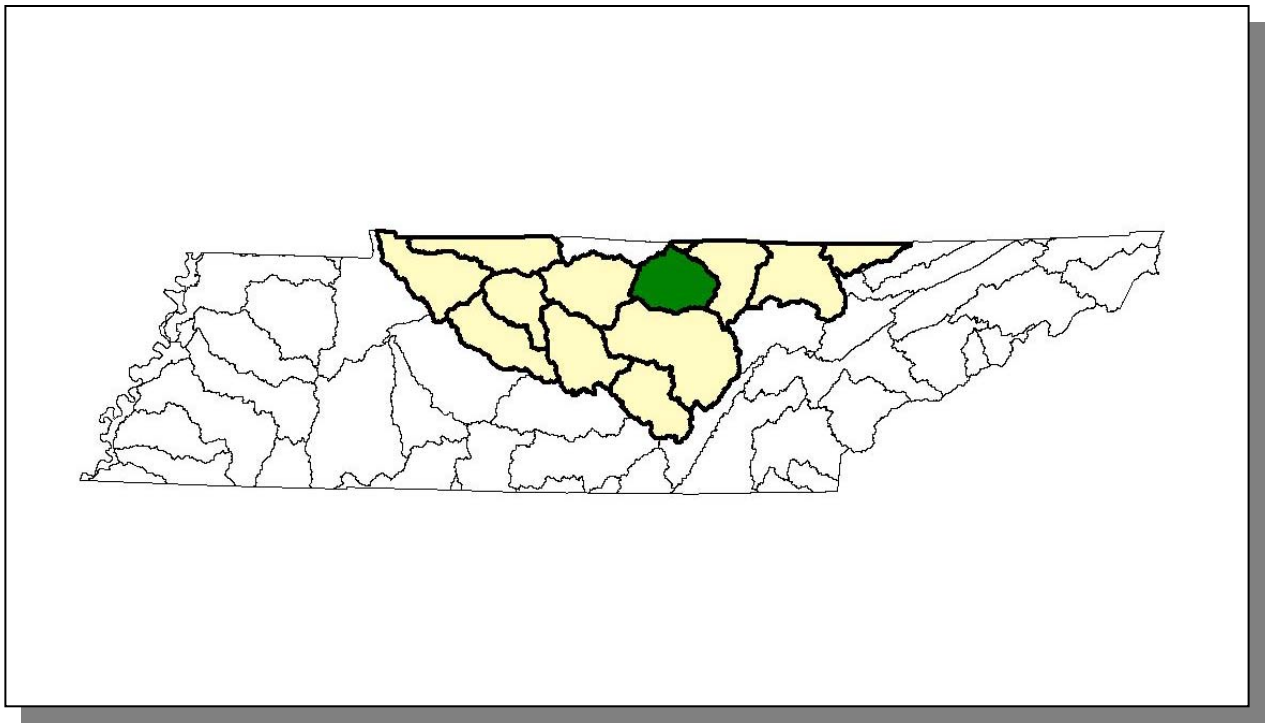

Figure 2-3. The Cordell Hull Lake Watershed is Part of the Cumberland River Basin.

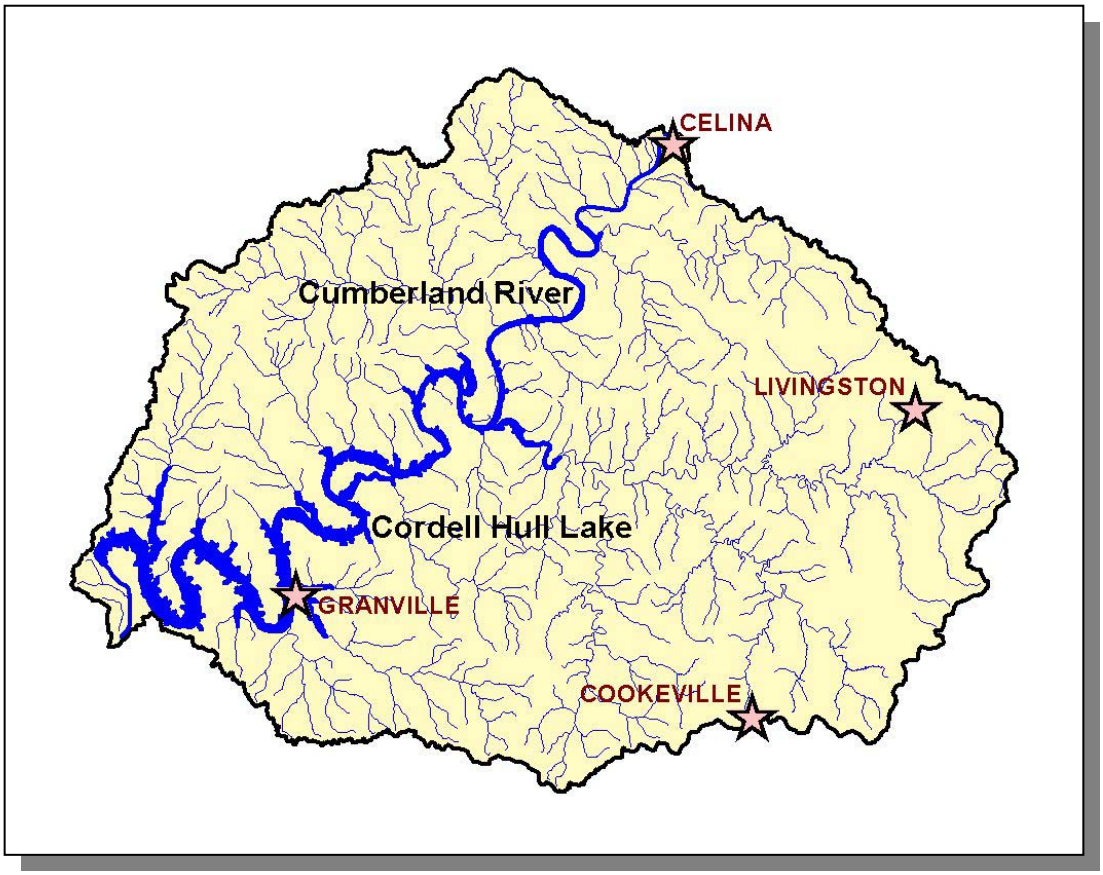

Figure 2-4. Hydrology in the Cordell Hull Lake Watershed. *There are 893.8 stream miles and 13,901 lake acres recorded in River Reach File 3 in the Cordell Hull Lake Watershed. Location of the Cumberland River including Cordell Hull Lake, and the cities of Celina, Cookeville, Granville, and Livingston are shown for reference.*

2.3.B. Dams. There are 16 dams inventoried by TDEC Division of Water Supply in the Cordell Hull Lake Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

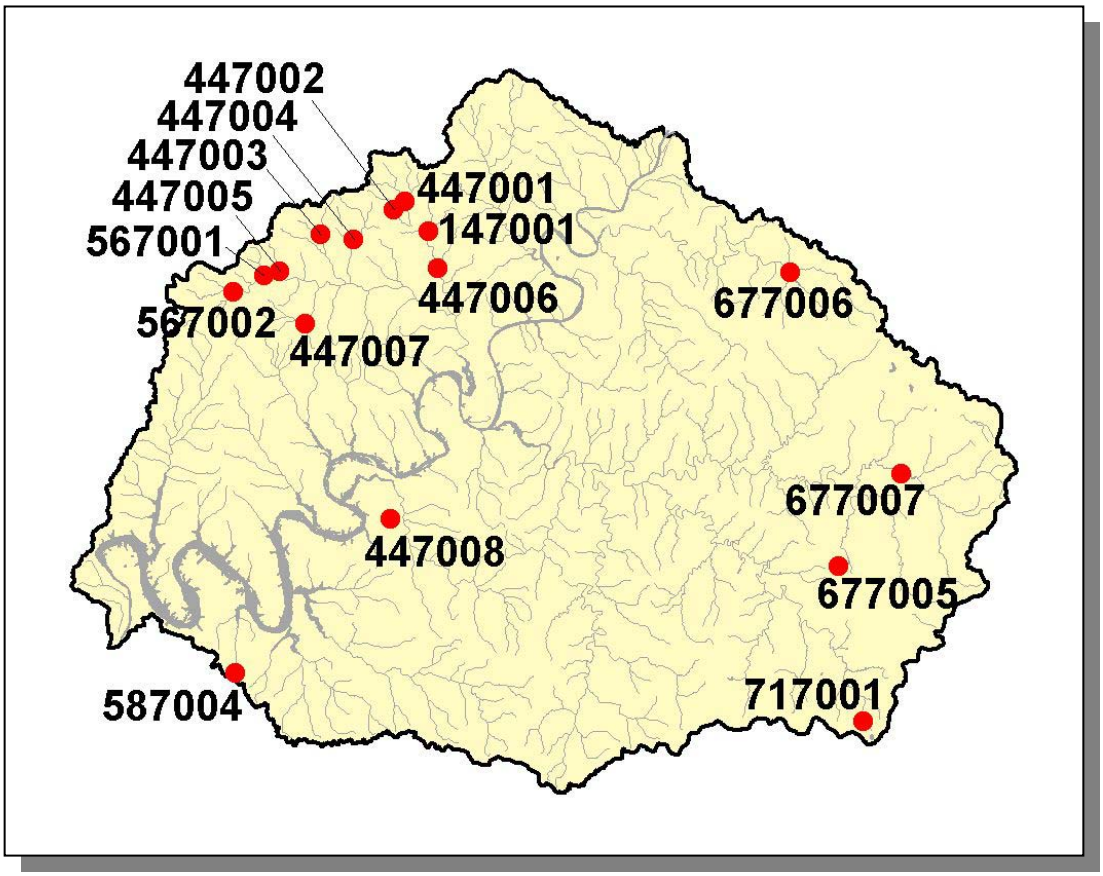

Figure 2-5. Location of Inventoried Dams in the Cordell Hull Lake Watershed. *More information is provided in Appendix II and at http://gwidc.memphis.edu/website/dws/.*

2.4. LAND USE. Land Use/Land Cover information was provided by EPA Region 4 and was interpreted from 1992 Multi-Resolution Land Cover (MRLC) satellite imagery.

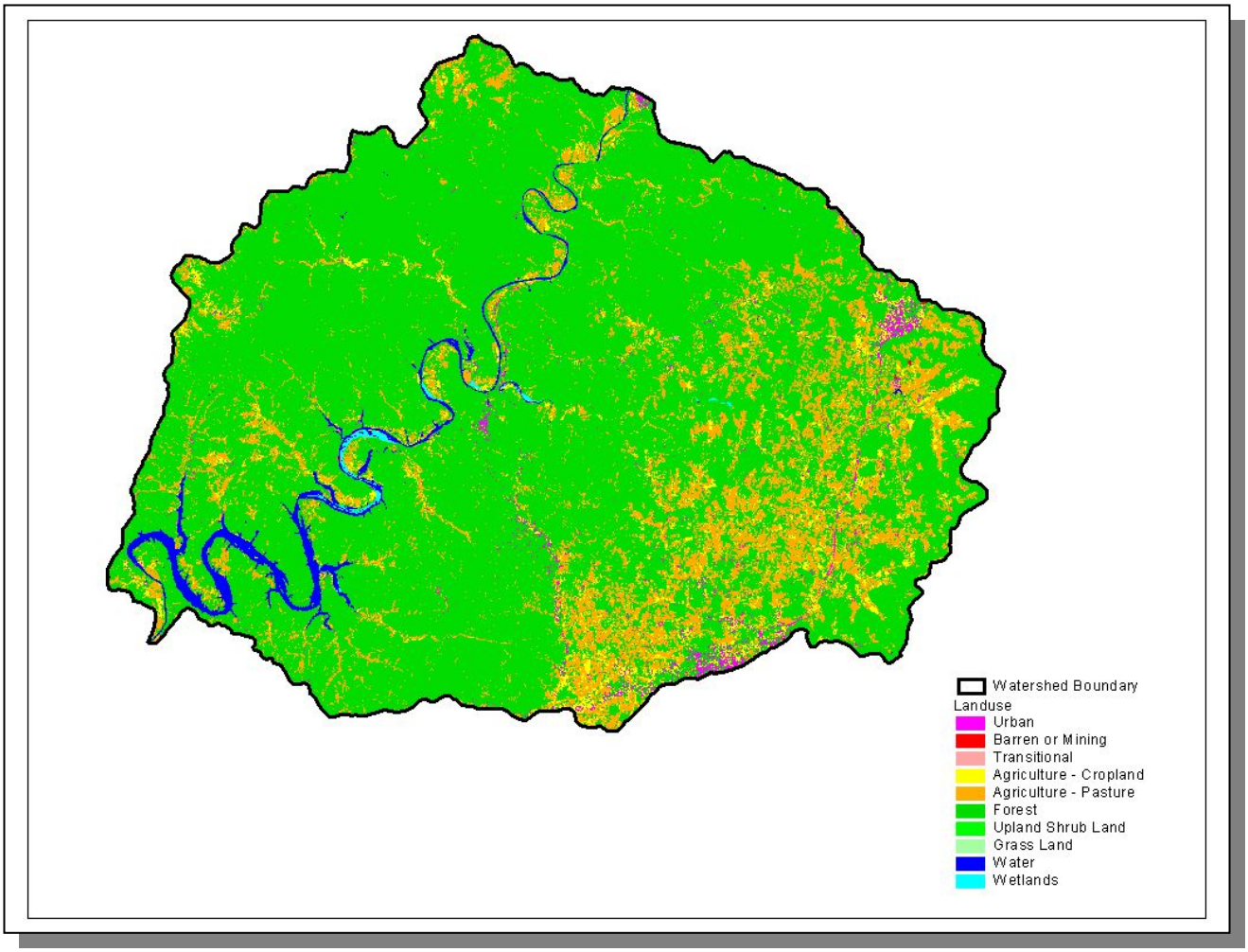

Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

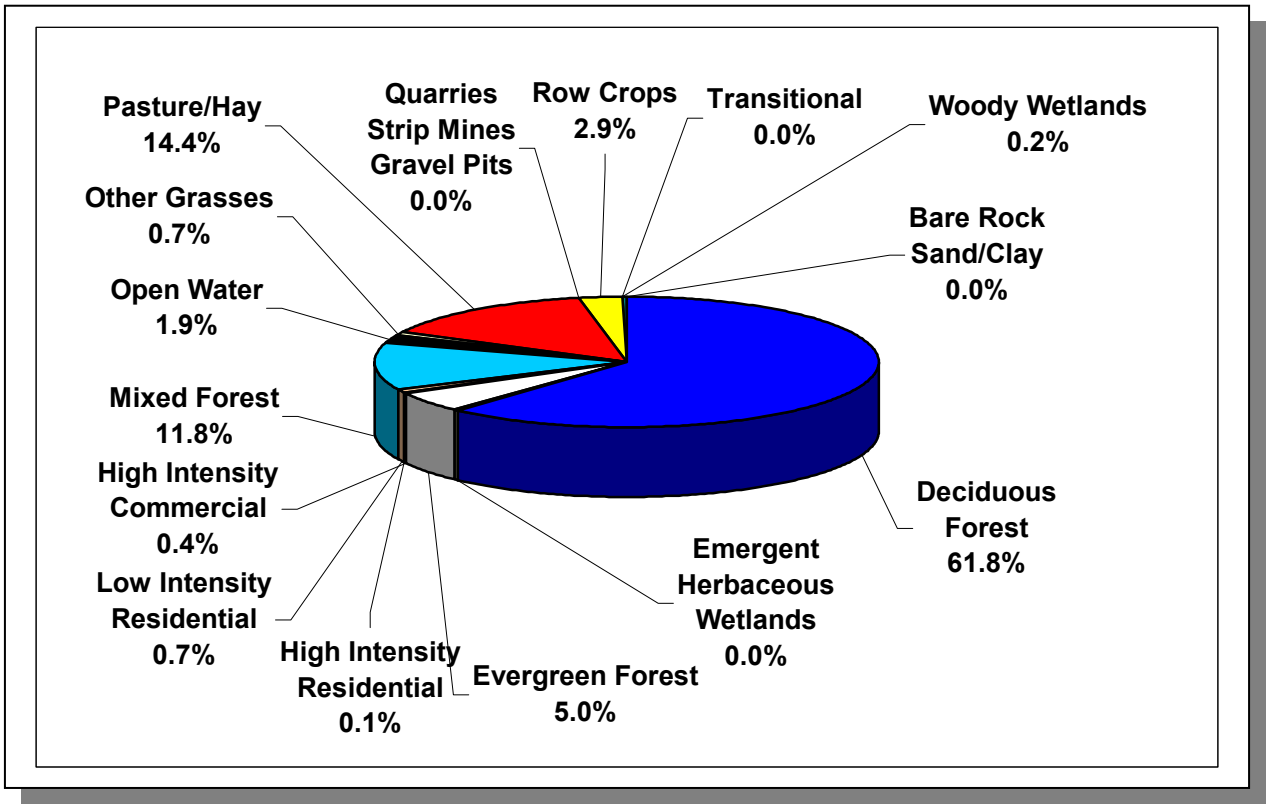

Figure 2-7. Land Use Distribution in the Cordell Hull Lake Watershed. *More information is provided in Appendix II.*

Sinkholes, springs, disappearing streams and caves characterize karst topography. The term "karst" describes a distinctive landform that indicates dissolution of underlying soluble rocks by surface water or ground water. Although commonly associated with limestone and dolomite (carbonate rocks), other highly soluble rocks such as gypsum and rock salt can be sculpted into karst terrain. In karst areas, the ground water flows through solution-enlarged channels, bedding planes and microfractures within the rock. The characteristic landforms of karst regions are: closed depressions of various size and arrangement; disrupted surface drainage; and caves and underground drainage systems. The term "karst" is named after a famous region in the former country of Yugoslavia.

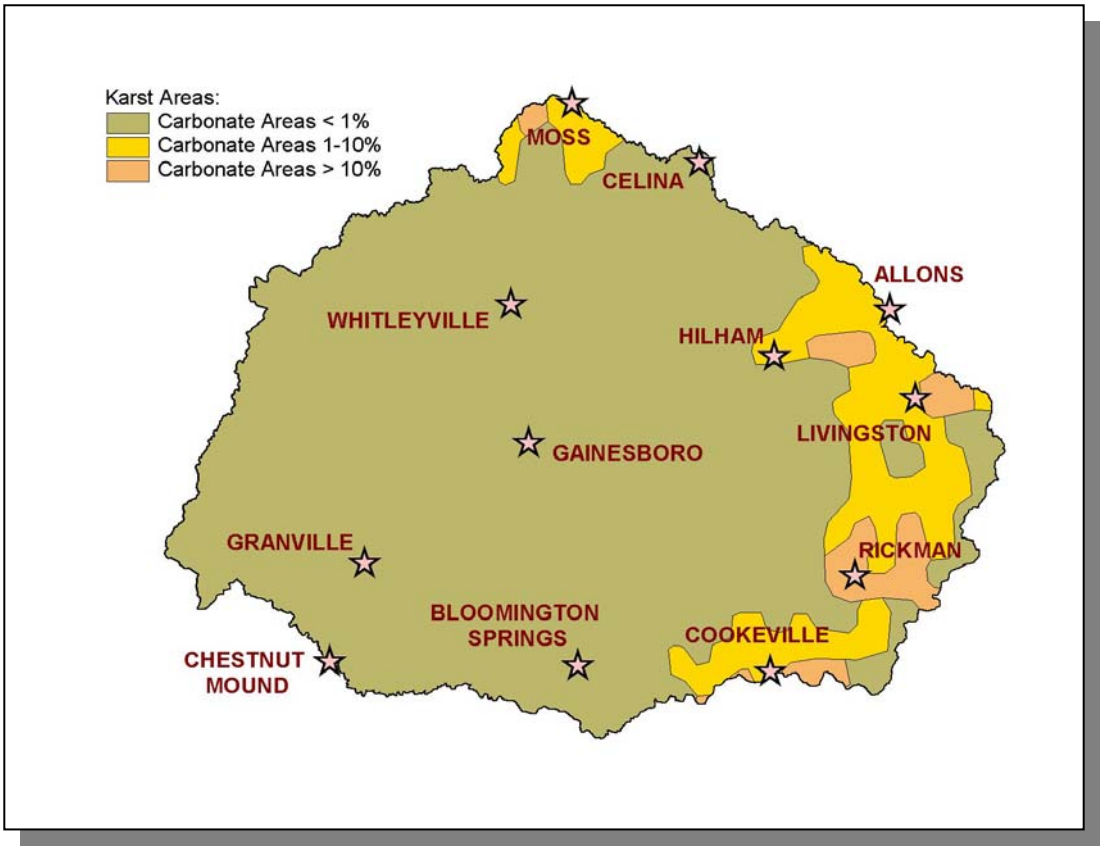

Figure 2-8. Illustration of Karst Areas in Cordell Hull Lake Watershed. *Locations of communities in the watershed are shown for reference.*

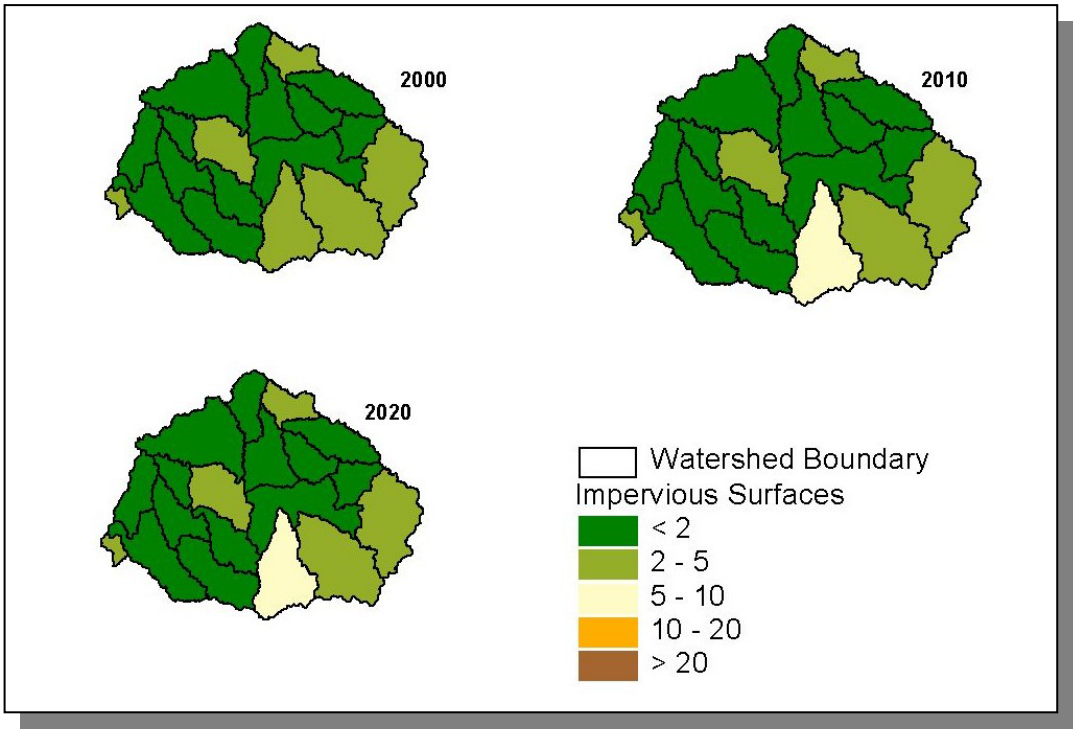

Figure 2-9. Illustration of Total Impervious Area in the Cordell Hull Lake Watershed. *All HUC-12 subwatersheds are shown. Current and projected total impervious cover is provided by EPA Region 4. More information can be found at: http://www.epa.gov/ATHENS/research/impervious/*

2.5. ECOREGIONS AND REFERENCE STREAMS. Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plant and animal life. Ecoregions serve as a spatial framework for the assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregion studies can aid the selection of regional stream reference sites, identifying high quality waters, and developing ecoregion-specific chemical and biological water quality criteria.

There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee. The Cordell Hull Lake Watershed lies within 2 Level III ecoregions (Southwestern Appalachians and Interior Plateau) and contains 3 Level IV subecoregions:

- The **Plateau Escarpment (68c)** is characterized by steep, forested slopes and high velocity, high gradient streams. Local relief is often 1000 feet or more. The geologic strata include Mississippian-age limestone, sandstone, shale, and siltstone, and Pennsylvania-age shale, siltstone, sandstone, and conglomerate. Streams have cut down into the limestone, but the gorge talus slopes are composed of colluvium with huge angular, slabby blocks of sandstone. Vegetation community types in the ravines and gorges include mixed oak and chestnut oak on the upper slopes, more mesic forests on the middle and lower slopes (beech-tulip poplar, sugar maple-basswood-ash-buckeye), with hemlock along rocky streamsides and river birch along floodplain terraces.

- The **Eastern Highland Rim (71g)** has level terrain, with landforms characterized as tablelands of moderate relief and irregular plains. Mississippian-age limestone, chert, shale, and dolomite predominate, and karst terrain sinkholes and depressions are especially noticeable between Sparta and McMinnville. Numerous springs and spring-associated fish fauna also typify the region. Natural vegetation for the region is transitional between the oak-hickory type to the west and the mixed mesophytic forests of the Appalachian ecoregions (68, 69) to the east. Bottomland hardwood forest has been inundated by several large impoundments. Barrens and former prairie areas are now mostly oak thickets or pasture and cropland.

- The **Outer Nashville Basin (71h)** is a more heterogeneous region than the Inner Nashville Basin, with more rolling and hilly topography and slightly higher elevations. The region encompasses most all of the outer areas of the generally non-cherty Ordovician limestone bedrock. The higher hills and knobs are capped by the more cherty Mississippian-age formations, and some Devonian-age Chattanooga shale, remnants of the Highland Rim. The region's limestone rocks and soils are high in phosphorus, and commercial phosphate is mined. Deciduous forests with pasture and cropland are the dominant land covers. Streams are low to moderate gradient, with productive nutrient-rich waters, resulting in algae, rooted vegetation, and occasionally high densities of fish. The Nashville Basin as a whole has a distinctive fish fauna, notable for fish that avoid the region, as well as those that are present.

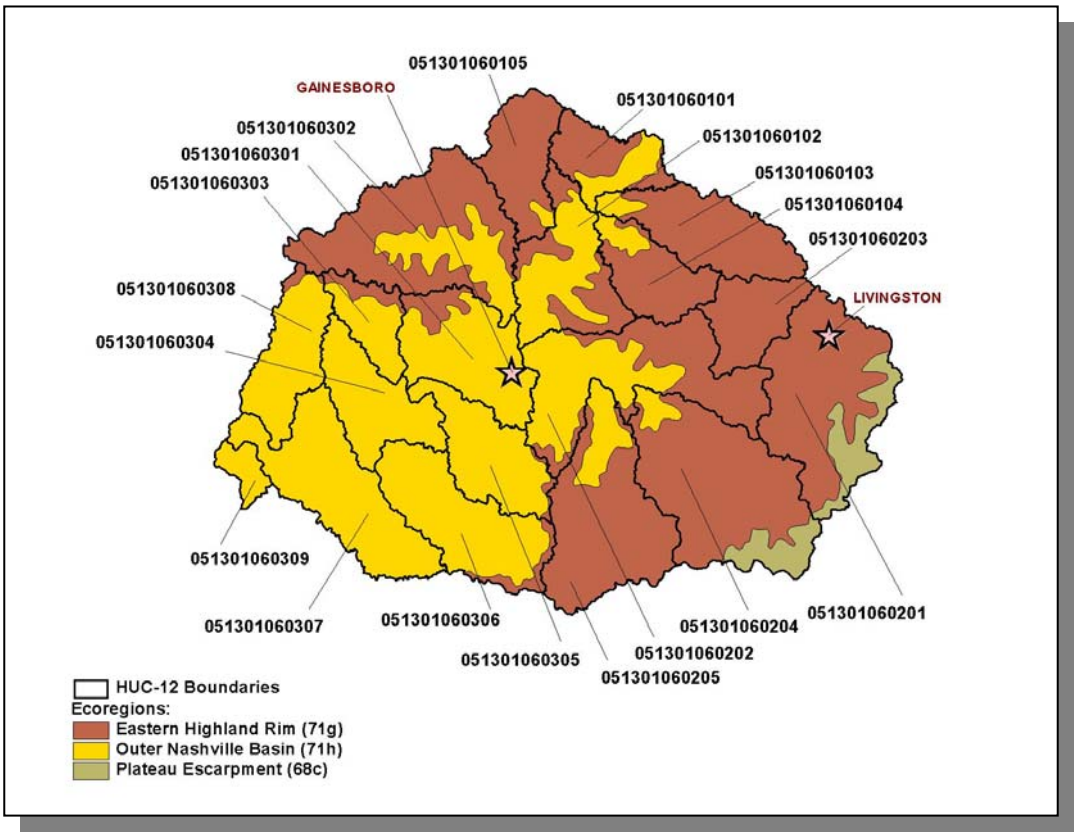

Figure 2-10. Level IV Ecoregions in the Cordell Hull Lake Watershed. *Locations of Gainesboro and Livingston are shown for reference.*

Each Level IV Ecoregion has at least one reference stream associated with it. A reference stream represents a least impacted condition and may not be representative of a pristine condition.

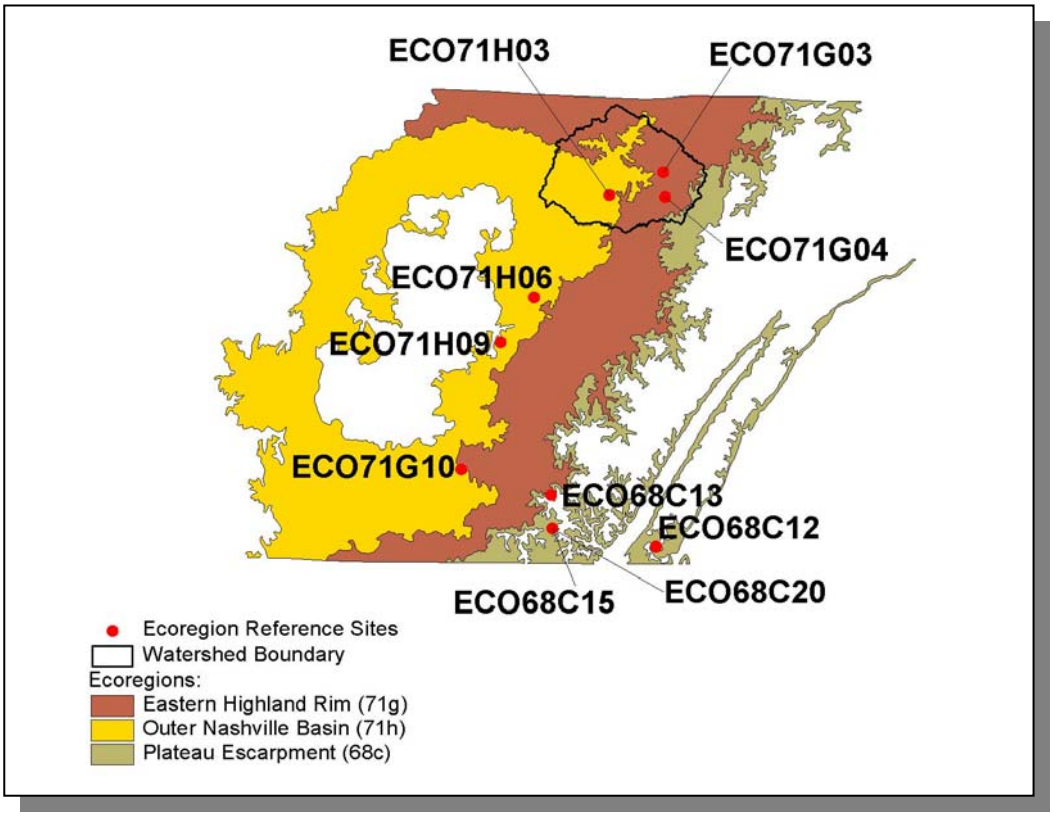

Figure 2-11. Ecoregion Monitoring Sites in Level IV Ecoregions 68c, 71g, and 71h. *The Cordell Hull Lake Watershed is shown for reference. More information, including which ecoregion reference sites were inactive or dropped prior to 01/01/2006, is provided in Appendix II.*

2.6. NATURAL RESOURCES.

2.6.A. Designated State Natural Area. The Natural Areas Program was established in 1971 with the passage of the Natural Areas Preservation Act. TDEC/Division of Natural Heritage administers the State Natural Areas program. Further information may be found at http://www.state.tn.us/environment/nh/natareas/

The Cordell Hull Lake Watershed has one Designated State Natural Area:

> **Washmorgan Hollow Class II Natural-Scientific State Natural Area** is a 73-acre natural area in Jackson County and is owned by The Nature Conservancy of Tennessee. This sheltered ravine on the Eastern Highland Rim has a rich and diverse flora uncommon in many other areas in the region. It provides excellent habitat for plants and animals alike. The narrow winding ridges are separated by steep slopes that drop between 200 and 300 feet to the bottom of the hollow. A perennial stream tumbles over a waterfall at the head of the hollow. The stream flows out of Washmorgan Hollow into Roaring River just below the confluence where Spring Creek enters Roaring River. Both of these are state scenic rivers.

Figure 2-12. There is One Designated State Natural Area in the Cordell Hull Lake Watershed.

2.6.B. Rare Plants and Animals. The Heritage Program in the TDEC Division of Natural Heritage maintains a database of rare species that is shared by partners at The Nature Conservancy, Tennessee Wildlife Resources Agency, the US Fish and Wildlife Service, and the Tennessee Valley Authority. The information is used to: 1) track the occurrence of rare species in order to accomplish the goals of site conservation planning and protection of biological diversity, 2) identify the need for, and status of, recovery plans, and 3) conduct environmental reviews in compliance with the federal Endangered Species Act.

GROUPING	NUMBER OF RARE SPECIES
Crustaceans	1
Insects	5
Mussels	1
Snails	2
Other	1
Amphibians	3
Birds	4
Fish	6
Mammals	7
Plants	13
Total	**43**

Table 2-3. There are 43 Known Rare Plant and Animal Species in the Cordell Hull Lake Watershed.

In the Cordell Hull Lake Watershed, there are six known rare fish species, one known rare mussel species, and two known rare snail species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Acipenser fulvensis	Lake sturgeon		E
Ammocrypta asperella	Crystal darter		D
Cycleptus elongates	Blue sucker		T
Etheostoma cinereum	Ashy darter		T
Etheostoma obeyense	Barcheek darter		
Typhlichthys subterraneus	Southern cavefish		D
Dromus dromas	Dromedary pearlymussel	LE	E
Lithasia armigera	Armored rocksnail		
Zonitoides lateumbilicatus	Striate gloss		

Table 2-4. Rare Aquatic Species in the Collins River Watershed. *Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service. State Status: LT, Listed Threatened by the Tennessee Wildlife Resources Agency; E, Listed Endangered by the Tennessee Wildlife Resources Agency; D, Deemed in Need of Management by the Tennessee Wildlife Resources Agency. More information may be found at http://www.state.tn.us/environment/na/.*

2.6.B. Wetlands. The Division of Natural Heritage maintains a database of wetland records in Tennessee. These records are a compilation of field data from wetland sites inventoried by various state and federal agencies. Maintaining this database is part of Tennessee's Wetland Strategy, which is described at:

http://www.state.tn.us/environment/nh/wetlands/

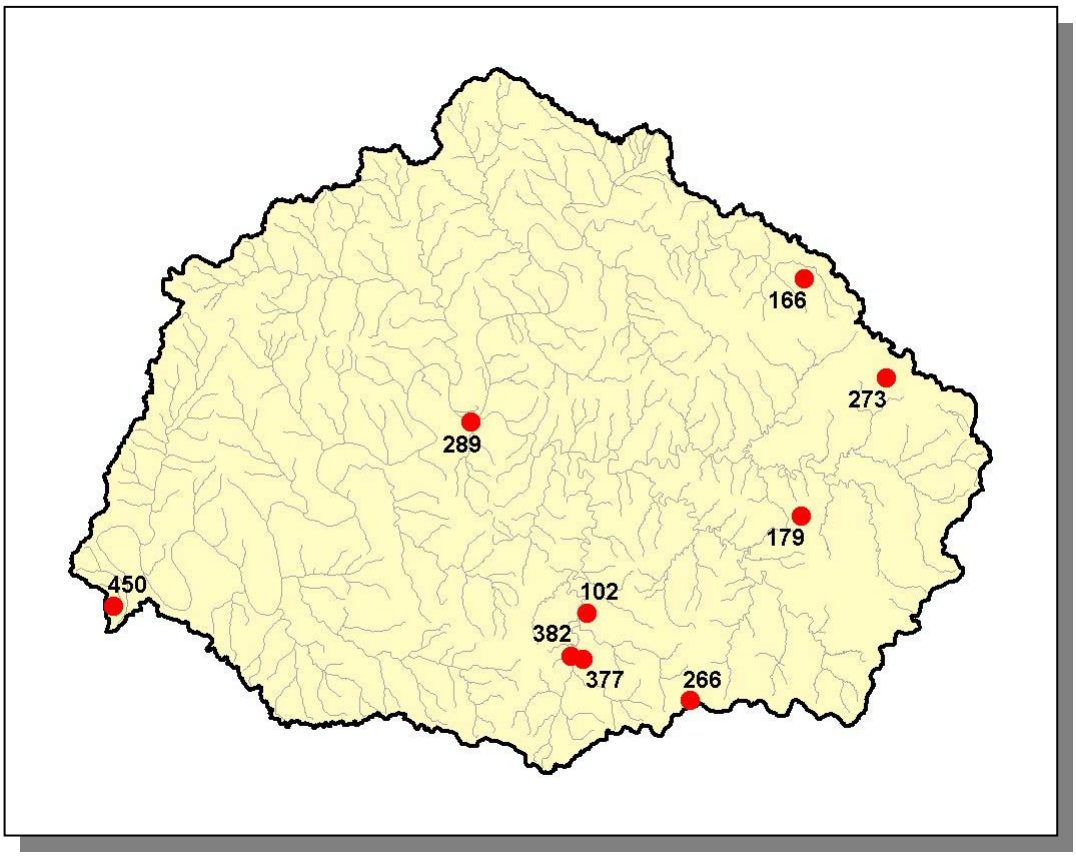

Figure 2-13. Location of Wetland Sites in TDEC Division of Natural Heritage Database in Cordell Hull Lake Watershed. ***This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands.*** *There may be additional wetland sites in the watershed. More information is provided in Appendix II.*

2.7. CULTURAL RESOURCES.

2.7.A. State Scenic River. Portions of Roaring River, Blackburn Fork, and Spring Creek are designated as State Scenic Rivers.

Roaring River is designated as a Class I Natural River Area (That segment from State Route 136 downstream two (2.0) miles) and a Class II Pastoral River Area (That segment downstream from the Class II Pastoral River Area to its confluence with the Cordell Hull Lake).

Blackburn Fork is designated as a Class I Natural River Area (That segment of the stream from the county road at Cummings Mill downstream one and one-half (1.5) miles) and a Class II Pastoral Area (That segment downstream from a point one and one-half (1.5) miles downstream from the county road at Cummings Mill to its confluence with Roaring River).

Spring Creek is designated as a Class I Natural River Area (That segment from Waterloo Mill downstream to the Overton-Jackson county line) and a Class II Pastoral River Area (That segment between State Highway 136 and Waterloo Mill, and that segment downstream from the Overton-Jackson county line to its confluence with Roaring River).

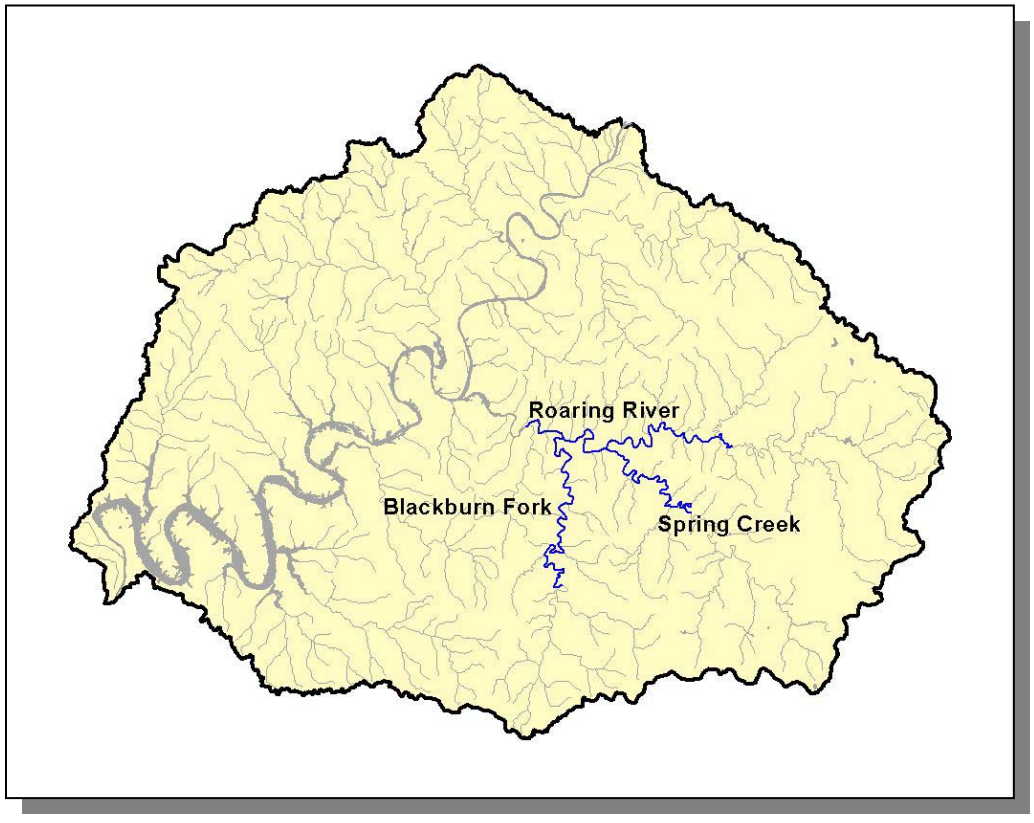

***Figure 2-14. Portions of Roaring River, Blackburn Fork, and Spring Creek are Designated State Scenic Rivers**. More information can be found at http://www.state.tn.us/environment/nh/scenicrivers/.*

2.7.B. Nationwide Rivers Inventory. The Nationwide Rivers Inventory, required under the Federal Wild and Scenic Rivers Act of 1968, is a listing of free-flowing rivers that are believed to possess one or more outstanding natural or cultural values. Exceptional scenery, fishing or boating, unusual geologic formations, rare plant and animal life, cultural or historic artifacts that are judged to be of more than local or regional significance are the values that qualify a river segment for listing. The Tennessee Department of Environment and Conservation and the Rivers and Trails Conservation Assistance branch of the National Park Service jointly compile the Nationwide Rivers Inventory from time to time (most recently in 1997). Under a 1980 directive from the President's Council on Environmental Quality, all Federal agencies must seek to avoid or mitigate actions that would have an adverse effect on Nationwide Rivers Inventory segments.

The most recent version of the Nationwide Rivers Inventory lists portions of four streams in the Cordell Hull Lake Watershed:

Blackburn Fork (RM 0 to RM 20) is a small, scenic stream with outstanding 75 foot Cummins Mill Falls.

Flynn Creek (RM 0 to RM 10) is a small, scenic mountain stream that supports a game fishery.

Roaring River (RM 1 to RM 39) flows through an area with sheer gorge walls, rock ledges, and gardens.

Spring Creek (RM 0 to RM 25) flows through a spectacular gorge area with intricately carved bluffs, a 35-foot waterfall, clear, sparkling water, small riffles and shallow pools, and heavily wooded banks.

RIVER	SCENIC	RECREATION	GEOLOGIC	FISH	WILDLIFE	HISTORIC	CULTURAL
Blackburn Fork	X	X	X		X		
Flynn Creek	X	X		X	X		
Roaring River	X	X	X	X	X	X	X
Spring Creek	X	X	X				

Table 2-5. Attributes of Streams Listed in the Nationwide Rivers Inventory.

Additional information may be found online at http://www.ncrc.nps.gov/rtca/nri/

2.7.C. Public Lands. Some sites representative of the cultural heritage are under state or federal protection:

- Cordell Hull Refuge is operated by the U.S. Army Corps of Engineers. More information may be found at http://www.orn.usace.army.mil/op/COR/rec/.

- Cordell Hull Wildlife Management Area is a 25,000-acre area managed by TWRA in Jackson and Smith Counties.

- Dam Site Recreation Area is located in the tailwaters of Cordell Hull Lake, near Carthage. More information may be found at http://www.reserveamerica.com/jsp/commonpage.jsp?goto=/nrrs/tn/tara/newindex.html

- Defeated Creek Recreation Area is operated by the U.S. Army Corps of Engineers. More information may be found at http://www.orn.usace.army.mil/op/COR/rec/.

- Fort Blount-Williamsburg Site is an historic site on the Cumberland River in Jackson County. It was built in 1787 to protect the newly created Avery Trace and is on the National register of Historic Places. More information may be found at:
http://tennesseeencyclopedia.net/imagegallery.php?EntryID=J006

- Granville Recreation Area is managed by the U.S. Army Corps of Engineers. More information may be found at http://www.orn.usace.army.mil/op/COR/rec/.

- Roaring River Recreation Area is managed by the U.S. Army Corps of Engineers. More information may be found at http://www.orn.usace.army.mil/op/COR/rec/.

- Salt Lick Creek Recreation Area is managed by the U.S. Army Corps of Engineers. More information may be found at http://www.orn.usace.army.mil/op/COR/rec/.

- Standing Stone State Forest is an 8,352-acre state forest located on the Highland Rim in Overton and Clay Counties. More information may be found at http://www.state.tn.us/agriculture/forestry/stateforests/9.html

- Standing Stone State Park covers nearly 11,000 acres on the Cumberland Plateau. More information may be found at http://www.state.tn.us/environment/parks/parks/StandingStone

- Standing Stone State Wildlife Management Area is an 8,764-acre area managed by TWRA in Overton County.

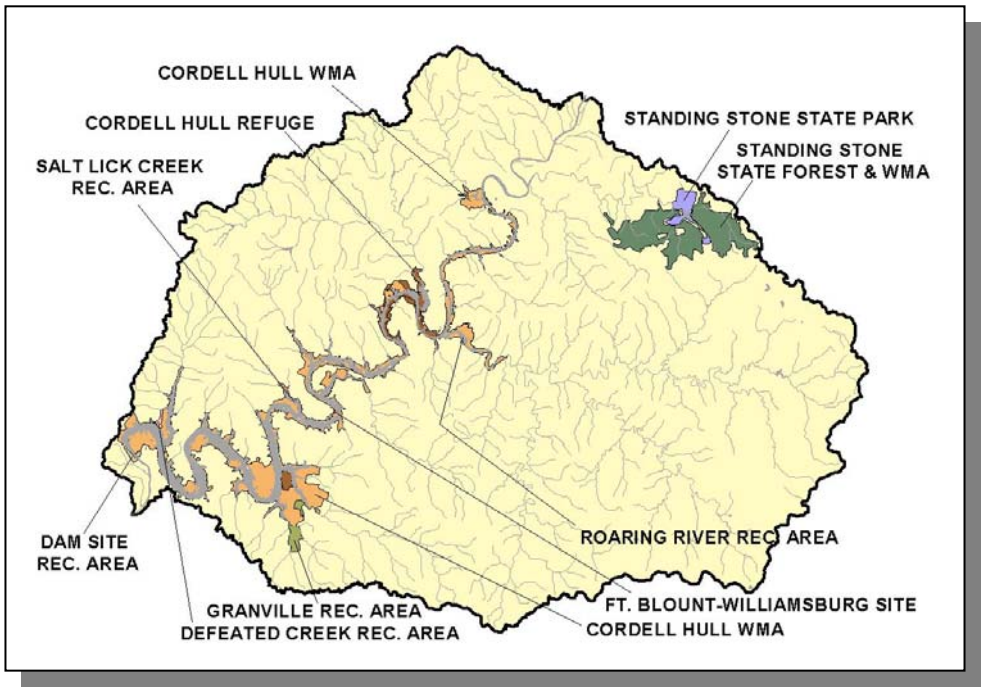

Figure 2-15. Public Lands in the Cordell Hull Lake Watershed. *Data are from Tennessee Wildlife Resources Agency. WMA, Wildlife Management Area.*

2.8. TENNESSEE RIVERS ASSESSMENT PROJECT. The Tennessee Rivers Assessment is part of a national program operating under the guidance of the National Park Service's Rivers and Trails Conservation Assistance Program. The Assessment is an inventory of river resources, and should not be confused with "Assessment" as defined by the Environmental Protection Agency. A more complete description can be found in the Tennessee Rivers Assessment Summary Report, which is available from the Department of Environment and Conservation and on the web at:

http://www.state.tn.us/environment/wpc/publications/riv/

STREAM	NSQ	RB	RF	STREAM	NSQ	RB	RF
B;ackburn Fork Creek	2	2		Martin Creek	3	2	2
Bowman Branch	1			Mill Creek (Trib of Cumberland River)	1	2	
Brimstone Creek	1	2		Mill Creek (Trib of Spring Creek)	3	2	
Bryans creek	1			Morgan Creek	3		
Carr Creek	3		3	Morrison Creek	3		
Cumberland River	1,2	2		Pine Lick Creek	1		
Defeated Creek				Right Fork Brimstone Creek	1	2	
Dry Fork Creek	2		1	Right Fork Creek	1		
East Fork Blackburn Fork	1			Roaring River	2,3	1,2	2,3
Flat Creek	1	2	2	Salt Lick Creek		1	1
Flynn Creek	2	2	1	Spring Creek	1	2,3	
Hudson Creek	3			Sugar Creek			4
Jennings Creek	2	2	2	Town Creek	3		
Knob Creek	3			Wartrace Creek	3		3
Left Fork Brimstone Creek	1	2		West Fork Blackburn Fork	1		2
Lick Creek			4	Zollicofter Creek	3		

Table 2-6. Stream Scoring from the Tennessee Rivers Assessment Project.

Categories: NSQ, Natural and Scenic Qualities
RB, Recreational Boating
RF, Recreational Fishing

Scores: 1. Statewide or greater Significance; Excellent Fishery
2. Regional Significance; Good Fishery
3. Local Significance; Fair Fishery
4. Not a significant Resource; Not Assessed